

وزارة التربية والتعليم
والتعليم الفني

نموذج إجابة

امتحان شهادة إتمام الدراسة الثانوية العامة

للعام الدراسى ٢٠١٦/٢٠١٧ - الدور الأول

المـادة : التفاضل والتكامل (باللغة الانجليزية)

نموذج



الأسئلة س ← إلى	الدرجة
١ ← ٤	٧
٥ ← ٦	٥
٧ ← ١١	٧
١٢ ← ١٤	٥
١٥ ← ١٨	٦
المجموع	٣٠

لكل مجموعة مقدر ومراجع

1-

(a) $x+\frac{1}{2}\sin 2x+c$



2-

Let , OA $= x$ and $OB = y$

$\therefore AD = x-3$

From the similarity of the two triangles DAC and OAB we found that $\frac{x-3}{x}=\frac{2}{y}$

$\therefore y=\frac{2x}{x-3}$

Area of Δ OAB $=\frac{1}{2}xy$



$A=\frac{1}{2}\times x\times\frac{2x}{x-3}=\frac{x^2}{x-3}$

A′= $\frac{2x(x-3)-x^2}{(x-3)^2}$



∴ at the least area A′= 0

$\therefore 2x^2-6x-x^2=0$

$x^2-6x=0$



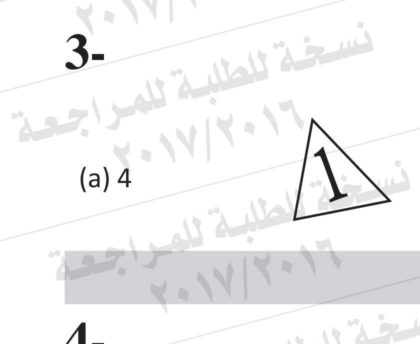
$\therefore x=0$ Oder $\therefore x=6$

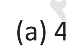
∴ the area is minimum at $x=6$

∴ the smallest area $=\frac{6^2}{6-3}=12$ area unit



3-





(a) 4

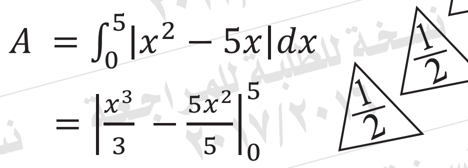
4-

The Points of intersection

$x^2 = 5x$

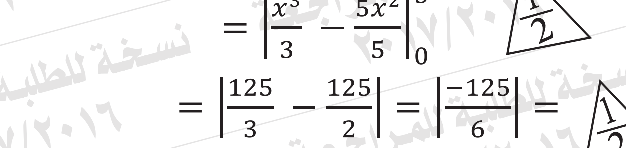
$x^2 - 5x = 0$

$\therefore\ x = 0 \quad \text{or}\ x = 5$



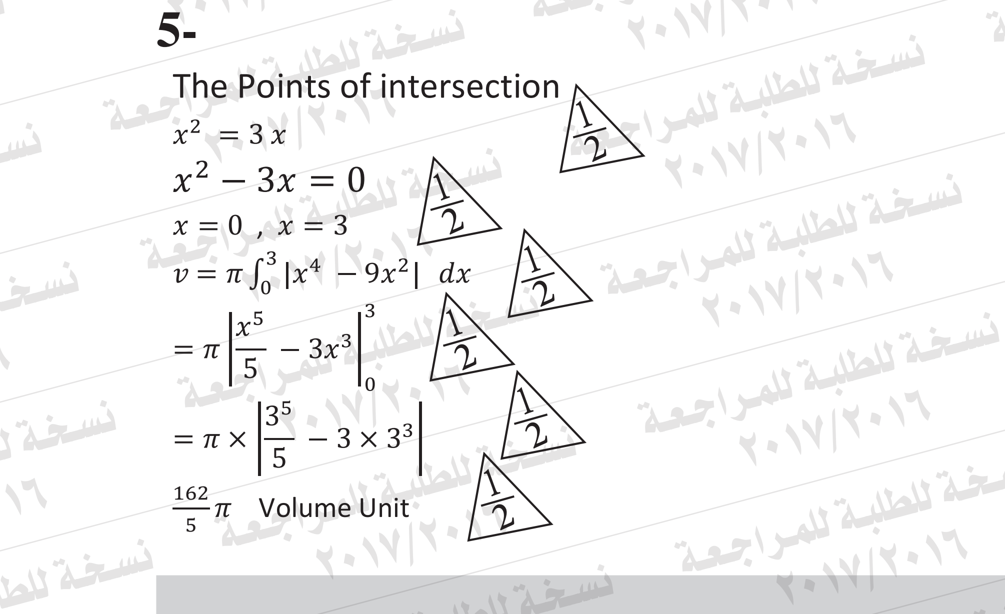
$A = \int_0^5 |x^2 - 5x|\, dx$

$= \left| \frac{x^3}{3} - \frac{5x^2}{5} \right|_0^5$



$= \left| \frac{125}{3} - \frac{125}{2} \right| = \left| \frac{-125}{6} \right| =$

$\therefore \text{Area} = \frac{125}{6}$ area unit



5-

The Points of intersection $\frac{1}{2}$

$x^2 = 3x$

$x^2 - 3x = 0$ $\frac{1}{2}$

$x = 0\ ,\ x = 3$ $\frac{1}{2}$

$v = \pi \int_0^3 |x^4 - 9x^2|\ dx$ $\frac{1}{2}$

$= \pi \left| \frac{x^5}{5} - 3x^3 \right|_0^3$ $\frac{1}{2}$

$= \pi \times \left| \frac{3^5}{5} - 3 \times 3^3 \right|$ $\frac{1}{2}$

$\frac{162}{5}\pi$ Volume Unit $\frac{1}{2}$

6-

(a) $\int \frac{x+1-1}{x+1}\, dx$ $\frac{1}{2}$

$= \int \left(1 - \frac{1}{x+1}\right) dx$ $\frac{1}{2}$

$= x - \ln|x+1| + c$ 1

(b) $\int x^2 \ln x\, dx$

$= \frac{1}{3} x^3 \ln x - \frac{1}{3} \int x^2 dx$ 1

$= \frac{1}{3} x^3 \ln x - \frac{1}{9} x^3 + c$ 1

7-

(d) $f(-2)$



8-

(c) $2x + c$

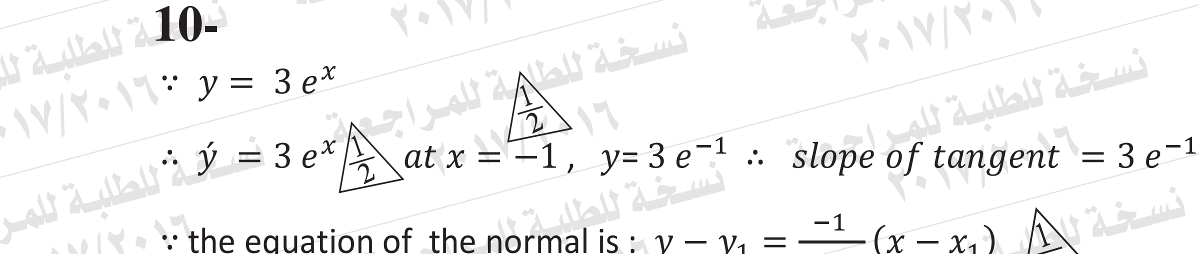
9-

(a) $ln|\sin x| + c$



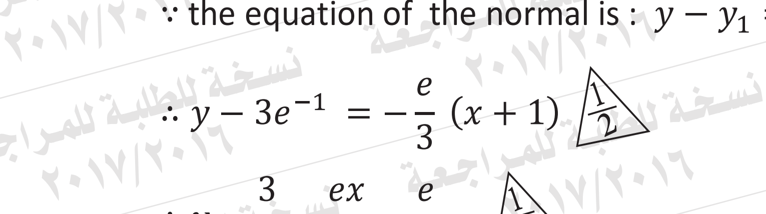
10-

$\because\ y = 3e^{x}$



$\therefore\ \acute{y} = 3e^{x}$ $\frac{1}{2}$ at $x = -1$, $y = 3e^{-1}$ $\frac{1}{2}$ $\therefore$ slope of tangent $= 3e^{-1} = \frac{3}{e}$ $\frac{1}{2}$

$\because$ the equation of the normal is : $y - y_1 = \frac{-1}{slope}(x - x_1)$ $\frac{1}{2}$



$\therefore y - 3e^{-1} = -\frac{e}{3}(x + 1)$ $\frac{1}{2}$

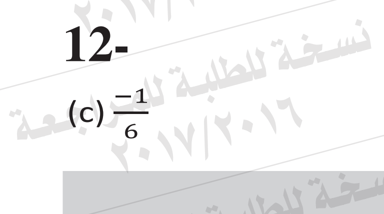
$\therefore y = \frac{3}{e} - \frac{ex}{3} - \frac{e}{3}$ $\frac{1}{2}$

11-

(a) $\frac{-\pi}{4}$



12-



(c) $\frac{-1}{6}$



13-

$\because x \times y = \frac{z+1}{z-1} \times \frac{z-1}{z+1} = 1$

$\therefore y = \frac{1}{x}$

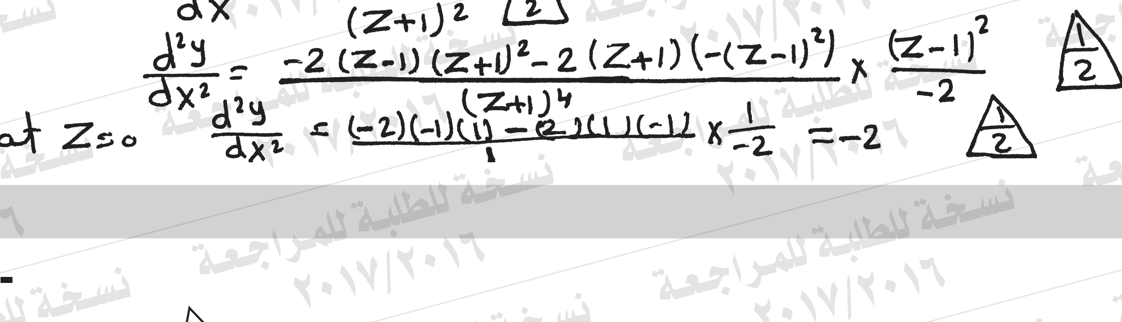
$y = x^{-1}$

$y' = -x^{-2}$

$y'' = 2x^{-3} \Longrightarrow (1)$

At $z = zero \therefore x = -1 \Longrightarrow (2)$

by Substitution in (1) $\frac{d^2y}{dx^2} = 2 \times (-1)^{-3} = -2$



Another Solution

$\frac{dx}{dz} = \frac{z-1-z-1}{(z-1)^2} = \frac{-2}{(z-1)^2}$

$\frac{dy}{dz} = \frac{z+1-z+1}{(z+1)^2} = \frac{2}{(z+1)^2}$

$\therefore \frac{dy}{dx} = \frac{-(z-1)^2}{(z+1)^2}$

$\frac{d^2y}{dx^2} = \frac{-2(z-1)(z+1)^2 - 2(z+1)(-(z-1)^2)}{(z+1)^4} \times \frac{(z-1)^2}{-2}$

at $z=0$ $\frac{d^2y}{dx^2} = \frac{(-2)(-1)(1) - (2)(1)(-1)}{1} \times \frac{1}{-2} = -2$

14-

$\because A = \pi r^2$

$\therefore \frac{dA}{dt} = 2\pi r \times \frac{dr}{dt}$

After 5 seconds $r = 4 \times 5 = 20\ cm$



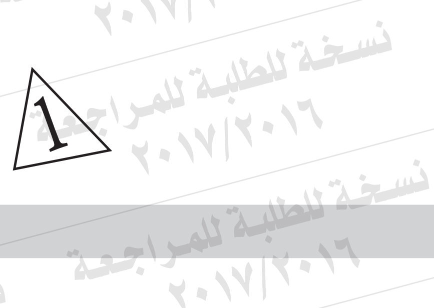
$\therefore \frac{dA}{dt} = 2\pi \times 20 \times 4$

$= 160\ \pi\ cm^2/\text{sec}$



15-

(a) 4



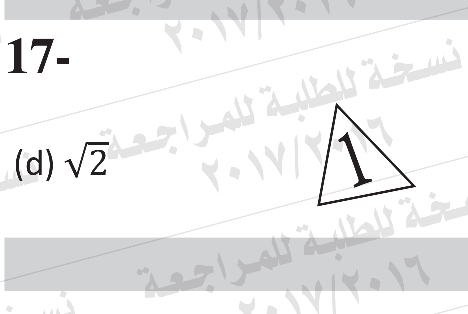
16-

(b) $-\frac{1}{4}$



17-

(d) $\sqrt{2}$

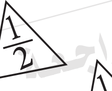


18-

(a)

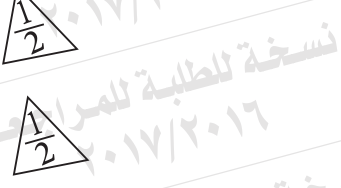
The domain of the function is R.

$f(x) = (2-x)e^x$

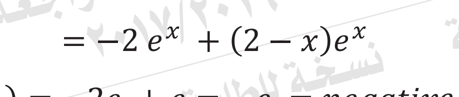
$f'(x) = -e^x + (2-x)e^x$ 

$f'(x) = 0$ at the critical points 

$\therefore -e^x + (2-x)e^x = 0$

$\therefore -1 + 2 - x = 0 \quad \therefore x = 1$ 

$f''(x) = -e^x - e^x + (2-x)e^x$

$= -2\, e^x + (2-x)e^x$  

$f''(1) = -2e + e = -e = negative$

$\therefore$ There is a maximum value at $x = 1$ equals e 

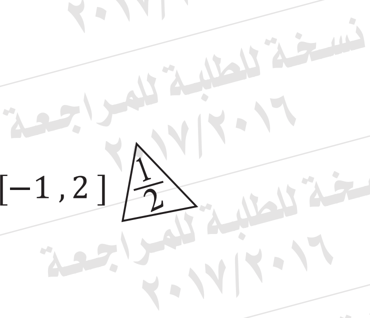
(b)

$\because f(x) = 3x^4 - 4x^3$

$\therefore f'(x) = 12\, x^3 - 12x^2$

$\because \quad f'(x) = 0$

$\therefore 12\, x^2(x-1) = 0$

$\therefore x = 0 \in [-1, 2]$ or $x = 1 \in [-1, 2]$ 

$f(0) = 3 \times 0^4 - 4 \times 0^3 = 0$

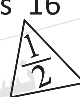
$f(1) = 3 \times 1^4 - 4 \times 1^3 = -1$

$f(-1) = 3(-1)^4 - 4(-1)^3 = 7$

$f(2) = 3(2)^4 - 4(2)^3 = 16$



The minimum value is -1 , the maximum value is 16

(انتهت الإجابة وتراعى الحلول الأخرى)